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METHOD AND APPARATUS FOR UNIFORMLY ADDING PARTICULATES
TO A COATING ON COMESTIBLES, AND PRODUCTS PRODUCED
THEREBY

BACKGROUND OF THE INVENTION

[0001] The present invention relates to methods of uniformly applying particulate material onto comestible cores and to coated comestible products with uniformly applied particulates, and more particularly to methods and apparatus for uniformly adding speckle particulates to a sugar or sugarless coating on comestibles, such as chewing gum pellets, and products produced thereby.

[0002] Coated chewing gum and other comestible products are well known. Some products are made with a sugar coating, and others are made with a sugarless coating. For example, products that are designed to not promote tooth decay do not use fermentable sugars in the product, or in coatings on the product. Instead, sugarless sweeteners such as sorbitol, maltitol, xylitol, erythritol, lactitol, hydrogenated isomaltulose and others are used in the product.

[0003] It is also known to provide speckles on the chewing gum coating. For example, PCT Patent Publication No. WO 02/19834 discloses speckled, coated chewing gums. The speckles may be used to signal that the product comprises an oral care active. The speckles are discrete speckles which are easily visible against a background opaque coating. Flaked speckle material, such as "Insoluble Edible Glitter" from Watson Food Co., West Haven, CT., is dry sprayed onto the outermost opaque layer of the coated gum before the layer is dry.

[0004] Even though coated products with speckles on the outer coating have thus been suggested, for a product to be commercially successful, there must be a process for making the product inexpensively on a commercial scale. Also, with a speckled product, it is desirable that the speckles have a uniform, even though random, distribution over the surfaces of the products in the batch of coated products. Not only should the speckles be uniformly distributed over the entire surface of the product, but good process control and quality assurance practices require that the number of speckles on a product must be fairly uniform from one product to another within the batch, and from batch to batch. If consumers see a

wide variation in the number of speckles on one product compared to another product from the same manufacturer, they are likely to consider that some products are defective, especially where the number of speckles on the product is associated in the minds of the consumer with some other characteristic of the product, such as the level of oral care active in the product.

[0005] There are other ingredients that would be advantageous if they could be uniformly added to a coating in particulate form. For example, some flavors, high-intensity sweeteners, physiological cooling agents, food acids and medicaments may desirably be included in a coating, and may normally be supplied in a powder form. While these materials might be able to be added as part of a dry charge, there are some particulates that would be best if added by themselves, and many coating operations do not involve a dry-charge. These materials may thus need to be applied to the cores while the coating operation is underway in a very uniform manner, especially if they are used at low levels.

[0006] Thus, there is a need for an inexpensive process for repeatedly, uniformly distributing randomly applied particulates, such as colored speckles, on coated chewing gum and other comestibles on a large scale basis.

BRIEF SUMMARY OF THE INVENTION

[0007] A method of applying particulates to a coating on a comestible such that there is a uniform number of randomly applied particulates throughout a batch of products, and from one batch to the next, which can be used on large size commercial coating equipment, has been invented.

[0008] In one aspect, the invention is process for producing a coated comestible comprising placing a batch of comestible cores in a coating drum having an internal drum length of at least 4 feet; applying one or more coating syrups in multiple aliquots, with drying between applications, to build up a coating on the cores; and adding a quantity of particulates to the coating drum before the last applied aliquot of coating syrup has dried, such that the particulates are uniformly applied across the length of the bed and stick to the coating on the cores.

[0009] In another aspect, the invention is a process for producing a batch of coated comestible cores having speckles uniformly distributed on the coating of each of the cores in the batch, comprising the steps of adding a batch of comestible cores containing at least 200 kg of cores to a coating apparatus; applying aliquots of coating syrup to the cores in the apparatus to build up a coating on the cores; and while the cores are still wet from the application of coating syrup, applying about 0.2 to about 2 grams of speckle particulates per 1000 grams of coated cores in the batch.

[0010] In yet another aspect, the invention is a process for uniformly applying particulates to coated comestible cores comprising the steps of placing a batch of comestible cores in a coating apparatus; applying aliquots of coating syrup to build up a coating on the cores; and applying particulates to the cores while they are still wet with coating syrup, the particulates being applied from multiple, spaced apart, particulate distributors within the coating apparatus, the application of the particulates occurring simultaneously from each of the multiple particulate distributors.

[0011] In another aspect, the invention is a process for applying particulates to a plurality of comestible cores during the production of coated comestible cores comprising the steps of placing a batch of cores in a coating apparatus; applying aliquots of coating syrup while the cores are tumbled in the coating apparatus to build up a coating on the cores; dividing a predetermined total amount of particulates to be applied to the coated cores into at least three portions of approximately equal size; and applying each of the portions of particulates to the coated cores simultaneously from a different particulate distributor in the coating apparatus while the coated cores are being tumbled.

[0012] Another aspect of the invention is a process for producing comestible cores with a uniformly colored background coating and speckle particulates of a contrasting color comprising the steps of adding a batch of comestible cores to a coating apparatus; applying aliquots of coating syrup, at least some of which have a light colored pigment therein, to the cores in successive operations to build up a light colored coating on the cores; providing a quantity of speckle particulates that

have a contrasting color to the light colored pigment and a generally uniform size distribution; applying the quantity of speckle particulates to the cores in the coating apparatus while the coating syrup is still wet so that the speckle particulates stick to the light colored coating; and drying the wet coating syrup with the speckle particulates thereon rapidly after the speckle particulates are applied to avoid transfer of color from the speckle particulates on one coated core to the background coating on other cores in the batch.

[0013] Still another aspect of the invention is batch of at least 1000 kg of coated comestible cores in a coating apparatus, each of the coated cores having a hard crunchy coating of a first color and speckles of a second color randomly distributed over the cores, the cores in the batch having a generally uniform number of speckles from one coated core to the next.

[0014] In yet another aspect, the invention is an apparatus for producing coated comestible cores with particulates in the coating comprising a rotating drum having an internal drum length of at least 4 feet for holding and tumbling comestible cores during a coating operation; at least one syrup applicator for applying a coating syrup to the cores within the rotating drum; and a plurality of spaced apart, particulate distributors, each connected to a source of particulates, and placed within the drum, so as to uniformly distribute particulates to the cores while the drum is rotating.

[0015] Another aspect of the invention is an apparatus for producing coated comestible cores with particulates in the coating comprising a rotating drum for holding and tumbling comestible cores during a coating operation; at least one syrup applicator for applying coating syrup to the cores within the rotating drum; a plurality of spaced apart, particulate distributors placed within the drum; and a source of particulates that is controlled so as to supply particulates simultaneously to each of the particulate distributors so as to uniformly distribute particulates to the cores while the drum is rotating.

[0016] A further aspect of the invention is an apparatus for producing coated comestible cores with particulates in the coating comprising a coating apparatus for holding and tumbling comestible cores during a coating operation; at least one

syrup applicator for applying a coating syrup to the cores within the coating apparatus; and a plurality of spaced apart, speckle distributors placed within the coating apparatus, each of the particulate distributors being connected to a supply of particulates.

[0017] In another aspect, the invention is an apparatus for automatically coating comestible cores with a coating having particulates therein, the apparatus comprising a coating apparatus for holding and tumbling comestible cores during a coating operation; at least one syrup applicator for applying coating syrup to the cores within the coating apparatus; a controller connected to the at least one syrup applicator that controls the application of syrup in separate aliquots; at least one particulate distributor placed within the coating apparatus connected to a supply of particulates; and a controller connected to the particulate supply that automatically activates the supply of particulates to the at least one particulate distributor at a predetermined time after a predetermined aliquot of syrup has been applied.

[0018] In yet a further aspect, the invention is an apparatus for applying particulates to a batch of coated comestible cores comprising a rotating body for holding and tumbling the comestible cores; at least one syrup applicator for applying coating syrup to the tumbling cores; and a particulate applicator comprising i) at least one particulate distributor positioned to distribute particulates on the tumbling cores; ii) a number of venturi eductors equal to the number of particulate distributors; iii) a pneumatic hose connected between each venturi eductor and each particulate distributor; and vi) a vibratory pan for holding a quantity of particulates and causing the particulates to vibrate and flow at a uniform rate into each venturi eductor.

[0019] Another aspect of the invention is an apparatus for dividing a quantity of particulates into generally equal portions for uniform application to a batch of coated comestible cores comprising a sloped vibratory pan; and one or more dividers in the pan, each running generally parallel with the direction of slope, defining a plurality of lanes between the one or more dividers and the sides of the pan.

[0020] In a still further aspect the invention is a process for assuring quality control of uniformity of speckles on coated comestible cores in a batch comprising the steps of producing a batch of coated comestible cores having randomly distributed speckles over the surfaces of the comestible cores in the batch; selecting a sample size of at least 50 individual coated cores; grading each of at least 50 coated cores into one of at least 3 different classifications, each classification having a higher average number of speckles than the previous classification; rejecting the batch if over a first predetermined percentage of the at least 50 individual coated cores are classified in the classification with the fewest number of speckles; and also rejecting the batch if over a second predetermined percentage of the at least 50 individual coated cores are classified in the classification with the highest number of speckles.

[0021] The ability to make coated products on a large scale, while at the same time achieving a uniform distribution of particulates on the products and within batches of the products, provides a great advantage, in that high quality products can be manufactured on a profitable basis. In preferred embodiments, relatively inexpensive and automated equipment is used to divide particulates into generally equal portions and feed those portions into spaced particulate distributors within long coating drums. These and other advantages of the invention, as well as the invention itself, will be more easily understood in view of the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Fig. 1 is a perspective view of a preferred apparatus in accordance with a first embodiment of the present invention.

[0023] Fig. 2 is a partially broken away perspective view inside a rotatable drum shown in Fig. 1.

[0024] Fig. 2A is an enlarged elevational view of a particulate distributor used in the drum of Fig. 2.

[0025] Fig. 3 is a perspective view of the particulate dividing and feeding equipment used in the apparatus of Fig. 1.

- [0026] Fig. 4 is an end elevational view of the equipment of Fig. 3.
- [0027] Fig. 5 is a top plan view of the equipment of Fig. 3.
- [0028] Fig. 6 is a side elevational view of the equipment of Fig. 3.
- [0029] Figs. 7A-7E depict coated chewing gum pellets with different levels of speckles applied thereon.

DETAILED DESCRIPTION OF THE DRAWINGS AND PREFERRED EMBODIMENTS

[0030] The present invention will now be further described. In the following passages, different aspects of the invention are defined in more detail. Each aspect so defined may be combined with any other aspect or aspects unless clearly indicated to the contrary. In particular, any feature indicated as being preferred or advantageous may be combined with any other feature or features indicated as being preferred or advantageous. The present invention will be explained and illustrated with respect to applying speckle particulates to coated chewing gum pellets. However, it will be understood that the invention is also applicable to other particulates and other comestibles that have a coating applied thereto, including comestible cores comprising a confectionery such as pressed tablets, and gummy and chewy candies. The term "chewing gum" as used herein also includes bubble gum and the like. Unless indicated otherwise, all percentages are given in weight percent. As used herein, the term "confectioneries" include things (gum, mints, etc) which would normally be considered as confectionaries regardless of whether or not they include medicaments.

[0031] There are several unique aspects to the present invention. Most of them relate to the process and apparatus for applying particulates, but a large scale batch of products with speckles uniformly distributed over the coated cores in a random fashion is also believed to be novel, as well as procedures for determining quality control of speckle application. The novel process and apparatus will be described first, and then products and quality control methods will be discussed. Finally, examples will be given utilizing the inventive processes and apparatus.

[0032] The preferred embodiments of the invention use commercially available coating equipment to build up a coating on the cores, but the equipment is modified to allow for a uniform application of particulates. The preferred applicator apparatus includes not only a plurality of particulate distributors within the coating equipment, but also includes a source of particulates that is controlled so as to supply particulates simultaneously to each of the particulate distributors so as to uniformly distribute particulates to the cores. Fig. 1 depicts an overall layout of an apparatus for applying particulates to a batch of coated comestible cores, both the coating equipment and the particulate applicator apparatus.

[0033] In the background, Fig. 1 shows an open door 12 to a conventional coating apparatus 10 that has been modified for use in practicing the present invention. In the foreground, Fig. 1 depicts the vibratory pan 40 and pneumatic delivery system, which constitutes the preferred way to supply particulates to the particulate distributors within the coating apparatus 10. Pneumatic hoses 50 carry the particulates from the vibratory pan 40 to the coating apparatus 10.

[0034] The coating apparatus 10 is shown partially broken away in Fig. 2 to make it easier to see the particulate distributors 20. While the present invention can be utilized with many different types of coating apparatus, the preferred coating apparatus comprises a rotating body, preferably a rotating horizontal drum, for holding and tumbling comestible cores during the coating operation. Such a drum will preferably be able to hold a batch of cores containing at least 200 kg, more preferably at least 500 kg of cores 14, and most preferably it will be able to hold a batch of at least 1000 kg of coated comestible cores. The drum will preferably have an internal drum length of at least 4 feet, more preferably at least 8 feet, and most preferably the drum is about 8 to about 12 feet in length. The drum will also preferably be at least 2 feet in internal diameter, and may be as large as 6 feet in diameter. One preferred type of rotating drum is one that is designed for minimal longitudinal movement of the cores 14 while the cores are being coated, especially when the particulate includes speckle particulates that should not be transferred from pellet to pellet. Alternatively, the speed of rotation may be reduced during application of the speckle particulates.

[0035] The coating apparatus 10 includes at least one syrup applicator for applying coating syrup to the cores within the rotating drum. The preferred syrup applicators are conventional and thus not further described. The coating apparatus will preferably also be able to add a dry charge, which is also conventional.

[0036] The apparatus for producing coated comestible cores with particulates on the coating comprises at least one particulate distributor 20 placed within the coating apparatus and positioned to distribute particulates on the tumbling cores 14. Preferably a plurality of spaced apart, particulate distributors 20 are employed. While only three distributors 20 are seen in Fig. 2, preferably at least four distributors, more preferably at least five distributors, and most preferably six distributors 20 are placed within the coating apparatus so as to uniformly distribute particulates to the cores while the drum is rotating. The preferred ratio of particulate distributors to drum length is at least one distributor for every two feet of drum length, and more preferably one distributor for every 1.5 feet of drum length. Each particulate distributor 20 is preferably located between about 18 inches and about 32 inches from another particulate distributor.

[0037] The preferred particulate distributors 20 each comprise a hose having a discharge outlet within the coating apparatus and connected to a supply of particulates. As shown in Fig. 2A, the preferred discharge outlet includes a conical diverter 22 suspended at the end of the hose 50. Each of the particulate distributors 20 is connected to a separate particulate supply source via a separate hose 50. In the apparatus of Fig. 2, which has six distributors 20, there are six hoses 50a – 50f. The particulates are thus preferably delivered pneumatically to the particulate distributors, each distributor being connected to a separate pneumatic hose, and thence to a separate particulate supply source.

[0038] While the present invention can be used to apply a variety of particulate material to a variety of comestible cores, the invention will be described hereafter as being used to apply colored speckle particulates, which is the presently preferred use of the invention. Other materials that may benefit from being applied with the methods and apparatus described herein include solid high-

intensity sweeteners, solid physiological cooling agents, solid flavors, granular food acids, and powdered medicaments, such as powdered caffeine.

[0039] While there are numerous possible ways of separately supplying each distributor with speckle particulates, it is preferred that the speckle particulate supply comprise an apparatus for dividing a quantity of speckle particulates into generally equal portions for uniform application to a batch of coated comestible cores. In this fashion, where the coating operation is carried out in a batch process, the entire quantity of speckle particulates to be applied to the batch can be weighed out in one measurement and then applied from different distributors within the coating apparatus. This assures batch to batch uniformity with respect to the total number of speckles that will be applied. Of course different size batches of cores will require proportionately different amounts of speckle particulates.

[0040] The preferred separate speckle particulate supply sources are thus provided by the apparatus shown in Figs. 3-6, which has two major systems, 1) a sloped vibratory pan 40 with dividers for holding a quantity of speckle particulates and causing the speckle particulates to vibrate and flow at a uniform rate, the dividers dividing the quantity of speckle particulates to be applied to one batch of cores within the drum into a number of portions equal to the number of speckle particulate distributors, and 2) an air system which entrains the speckle particulates in a flowing stream of air and conveys them pneumatically to the distributors 20.

[0041] As best seen in Fig. 3, the vibratory pan 40 has a holding section 42 and one or more dividers, preferably five dividers 44, in the opposite end of the pan from the holding section 42. Each of the dividers runs generally parallel with the direction of slope, defining a plurality of lanes 48, preferably six, between the dividers 44 and the sides 46 of the pan 40. An adjustable height gate is provided for each lane 48 to control the rate at which speckle particulates enter the lane from the holding section 42 as the pan is vibrating. The height of each gate may be adjusted independently. The gates are provided by strips 49 of metal or other material supported by crosspiece 43, which in turn is supported by the frame 41 of

the apparatus of Fig. 3. Either the strips or the crosspiece 43 may be provided with elongated slots, which allow a screw attaching the strip to the crosspiece to pass through the slot. The adjustability of the height of the strip 49 makes it easy to set the height of the gate and then tighten the screw to hold the strip at the desired elevation, and thus control how much particulate flows into the lane 48 associated with that gate. The position of the crosspiece 43 on the frame 41 can be changed, allowing the gates to be established at the beginning of the lanes 48, or closer to the end of the vibrating pan 40.

[0042] Vibratory pan 40 is vibrated by a vibrator 47 underneath the pan, best seen in Figs. 5 and 6. The vibrator is preferably a Model HS-42 Hi-Speed Vibratory Feeder from Eriez Manufacturing Company with headquarters in Erie, PA. Control knob 45 on the vibrator 47 preferably allows control of the amplitude of vibration of pan 40. However, once the vibrator is tuned for vibration of a given pan 40 and set for a proper amplitude of vibration for feeding speckle particulates at a desired rate, control knob 45 will not need further adjustment. The pan 40 may be provided with a hinged cover (not shown) to prevent objects from falling into the pan 40. Also, on the outlet of the lanes 48, the pan may be provided with a catcher to prevent any loose screws from falling with the speckle particulates off the end of the pan 40.

[0043] The air system includes an air supply, venturi eductors 52 (best seen in Fig. 6), collection tubes 54 and conveyance hoses 50. The number of venturi eductors 52 is equal to the number of speckle particulate distributors 20, and each eductor 52 is associated with one of the lanes 48 and has its own collection tube 54 and is connected to a different pneumatic conveyance hose 50. Thus, in the preferred embodiment, there are six eductors 52, six collection tubes 54, and six conveyance hoses 50. As speckle particulates are vibrated down the six lanes 48, they fall into the six collection tubes 54 and are entrained into a flowing air stream. The pneumatic hose 50 connected to each venturi eductor conveys the speckle particulates portion falling from the lane 48 associated with that eductor in a suspended form to a separate speckle particulate distributor 20.

[0044] Air is supplied to the venturi eductors 52 by six air supply hoses 56 from an air supply tank 58. The air tank 58 thus supplies uniform air pressure to each venturi eductor 52. Preferably, the eductors are 1 inch eductors, and the air in the air supply tank 58 is supplied at a pressure of about 1.5 psi by regulator 59. Should they be needed, individual valves 57 can be closed on each supply hose 56.

[0045] It is important that the quantity of speckles flowing down each lane 48 is generally equal. To get the gates adjusted when the speckle supply apparatus is first set up, it is beneficial if the collection tubes 54 can be moved out of the way. Then the speckle particulates falling off of each lane 48 are manually collected and weighed. This prevents the speckle particulates from being transported into the coating apparatus, where they would be more difficult to collect and measure. The strips 49 can then be moved up or down as needed, and the process repeated until generally equal amounts of speckle particulates flow down each lane. Thereafter the strips should be able to be left in place, as the gates are adjusted for operation with the vibratory pan 40. To allow the collection tubes 54 to be moved out of the way, the preferred apparatus supports the tops of all six collection tubes 54 with a single support 53 that may be disconnected from frame 41.

[0046] After the gates have been adjusted, the system is ready to be used to produce speckled, coated comestibles. A batch of comestible cores 14 of a known batch size is placed in the coating drum 10. One or more coating syrups are applied in multiple aliquots, with drying between applications, while the cores are tumbled in the coating apparatus to build up a coating on the cores. The final aliquot of coating syrup is applied to the coated cores. A quantity of speckle particulates is added to the coating drum before the final aliquot of coating syrup has dried, while the cores are still wet from the application of coating syrup, such that the speckle particulates are uniformly applied across the length of the bed and stick to the coating on the cores. The quantity of speckle particulates is preferably a predetermined amount based on the known batch size of the cores. This predetermined total amount of speckle particulates to be applied is then divided into multiple portions using the vibratory pan 40, preferably into at least three portions of approximately equal size, more preferably six portions, prior to its

addition to the drum. Each portion will preferably be within 90-110% of the weight of the average portion size. In this way a large batch of coated comestible cores having speckles uniformly distributed on the coating of each of the cores in the batch can be produced, the speckle particulates being applied from multiple, spaced apart, speckle particulate distributors 20 within the coating apparatus 10, each of the portions of speckle particulates being applied to the coated cores simultaneously from a different speckle particulate distributor 20 in the coating apparatus while the coated cores are being tumbled.

[0047] Preferably the speckle particulates are applied over a period that lasts between about 30 seconds and about 5 minutes, more preferably between about 1 and about 4 minutes, and most preferably about 2 minutes. The total amount of speckle particulates may still be in the process of being divided into the portions when the first part of each portion starts to be applied to the cores in the coating apparatus. Preferably the speckle particulates are applied at a ratio of about 0.2 to about 2 grams, more preferably between about 0.6 and about 1 gram, of speckle particulates per 1000 grams of coated cores in the batch. They are preferably applied such that the application of the speckle particulates is carried out in less than 1 second per 1000 grams of coated cores, more preferably less than 0.5 seconds per 1000 grams of coated cores. Even though at the very beginning and at the tail end of the speckle particulate application process the rate of application will build up and then decline, it is preferred that at least 90% of the total speckle particulates are applied at a uniform rate of amount per unit of time. Preferably at least 90% of the speckle particulates are applied at a uniform rate of between about 0.002 grams/second and about 0.006 grams/second per 1000 grams of coated cores.

[0048] In the preferred process, the comestible cores are produced with a uniformly light colored background coating, and the speckle particulates have a contrasting color. This can be accomplished by applying aliquots of coating syrup having a light colored pigment therein to the cores in successive operations to build up a light colored coating on the cores. The coating syrup preferably includes titanium dioxide as a pigment to produce a white background coating on

the cores. The preferred speckle particulates have a contrasting color to the light colored pigment color, such as blue, green, red and purple. More than one color of speckle particulates may be applied to give a coated product with multiple color speckles. The preferred coating syrups are aqueous based. Depending on the coating syrup, the preferred speckle particulates comprise either poorly water soluble particles, such as sodium alginate and color, or water soluble particles, such as gum arabic and color. The sodium alginate particles may be treated with a small amount of calcium ions to make them less soluble. This material is preferred when making maltitol coatings. However, gum arabic speckle particulates are currently preferred when xylitol is used to make the coating.

[0049] The speckle particulates preferably comprise about 0.2% to about 2% color, and more preferably about 0.4% to about 1% color. Preferred water soluble blue speckles, made with gum arabic and blue #1 dye at a level of about 0.5% dye in the speckles, are available as WT-7955 from Wixon/Fontarome of St. Francis, Wisconsin. Another source of blue speckle particulate is "Edible Glitter Blue – F290038" from Watson Foods Co., Inc., 301 Heffernan Drive, West Haven, Conn. 06516. This material contains gum arabic and FD&C blue #1. Preferred green speckles are water soluble material made with gum arabic and blue #1 dye and yellow #5 dyes at a level of about 0.5% of each dye in the speckles, also available from Wixon/Fontarome as WT-7955E. The poorly water soluble colors have about 0.6% color in sodium alginate.

[0050] The speckle particulates stick to the light colored coating. Preferably the wet coating syrup with the speckle particulates thereon is rapidly dried after the speckle particulates are applied to avoid transfer of color from the speckle particulates on one coated core to the background coating on other cores in the batch. In this way each of the coated cores has a coating of a first color and speckles of a second color randomly distributed over the cores. The cores in the batch have a generally uniform number of speckles from one coated core to the next.

[0051] One potential problem with producing a highly contrasting speckle on a light colored background is that if the speckle particulates include small particles,

especially if they are soluble in the coating solution, the small particles may dissolve and thus pigment the coating layer. Therefore it is preferred that the particulates have a generally uniform size distribution so that the coating conditions can be set to have good adhesion of the speckle particulate while minimizing dissolution of the particulate material. Preferably the speckle particulates will have a size distribution such that less than 30% of the speckle particulates will pass through a #60 U.S. standard sieve, and at least 90% of the speckle will pass through a #20 U.S. standard sieve. More preferably at least 45% of the speckle particulates will be retained on a #40 U.S. standard sieve, and the longest dimension of a majority of the speckle particulates will be between about 0.2 mm and about 0.6 mm. The Watson Foods Edible Glitter Blue – F290038 has a particle size where a minimum of 96% passes through an 8 mesh sieve, and a maximum of 30% oases through a 30 mesh sieve.

[0052] The preferred coating comprises a hard crunchy coating. However, the present invention is also applicable to soft panned coatings, both of which are described in more detail below. The preferred coatings are made with xylitol or maltitol. The preferred coated comestible is a confectionery with a mint flavor. The mint flavor can be in the core, the coating, or both. Of course other flavors may be used, as described below.

[0053] After the last layer of coating syrup with the speckle particulate adhered thereto is dried, a wax coating is preferably applied over the speckle particulates. Such wax coatings are conventional. However, care must be taken to avoid the wax application from causing the speckles to smear.

[0054] Preferably the apparatus for coating the comestible cores automatically applies the speckle particulate at the appropriate time. Most conventional coating apparatus has a controller 70 (Fig. 1) that allows an operator to program in the various coating operations, such as the drum rotation speed, the direction and rate of air flow through the drum, the timing and quantity of syrup applications, and pause times between each application while drying air is used, and the application of flavor and dry charge material when they are used in the coating. The controller is connected to the syrup applicator(s) and controls the application of

syrup in separate aliquots, thus making it possible to reproduce the sequence of coating steps necessary to build up the desired coating on the cores. In the preferred embodiment, the controller 70 is also connected to the speckle particulate supply, and automatically activates the supply of speckle particulates to the at least one speckle particulate distributor at a predetermined time after a predetermined aliquot of syrup has been applied. For example, the controller can be programmed to turn on the air supply to the venturi eductors 52 and start the vibratory pan 40 operating at a set point in the coating program so that speckle particulate material is delivered at just the right time when the last aliquot of coating syrup has been applied but is still wet.

[0055] There are several methods that can be used to determine that the speckles are uniformly distributed over the coated comestible cores. One preferred process for assuring quality control of uniformity of speckles on coated comestible cores in a batch involves producing a batch of coated comestible cores having randomly distributed speckles over the surfaces of the comestible cores in the batch; selecting a sample size of at least 50 individual coated cores; grading each of the coated cores into one of at least 3 different classifications, each classification having a higher average number of speckles than the previous classification; rejecting the batch if over a first predetermined percentage of the at least 50 individual coated cores are classified in the classification with the fewest number of speckles; and also rejecting the batch if over a second predetermined percentage of the at least 50 individual coated cores are classified in the classification with the highest number of speckles. The preferred first and second predetermined percentages are each 4%. Of course a greater number of coated cores can be used than 50, and a greater number of classifications than three, can be used.

[0056] Figs. 7A -7E show sample coated chewing gum pellets that can be used in a preferred quality assurance process, which thus has five classifications. For example, 100 coated cores could be randomly chosen from a batch. Those coated products would then be individually sorted and placed into a classification as having a number of speckles most similar to the sample products used to establish

the classification, such as those shown in Figs. 7A – 7E. Once the samples were all classified, the batch would be found to have a uniform speckle distribution if not more than 4 products were included in the classification corresponding to the sample with the fewest number of speckles, such as that shown in Fig. 7A, and not more than 4 products were included in the classification corresponding with the highest number of speckles, such as that shown in Fig. 7E.

[0057] Another test for uniformity also uses classifications, but then looks to see that a certain percentage of the total, such as 60%, 70% or even 80% or more, are within two adjacent classifications. The higher the percentage, the more uniform the speckle distribution. For example, a very uniform distribution would be achieved if at least 80% of the products had a number of speckles most like those shown in Figs. 7B and 7C. For a 100 product sample, this could be satisfied if 30 products were in the category of Fig. 7B and 50 or more of the products were in the category of Fig. 7C. The batch would also be considered to have a high uniformity if at least 80% of the products had a number of speckles most like those shown in Figs. 7C and 7D, such as 55 products that were closest looking to Fig 7C and at least 25 products that were closest looking to Fig. 7D. Of course the classifications can be different than those shown in Figs. 7A – 7E. It will always be difficult to classify the products from the samples because some will have a number of speckles that seem to be right in between two classifications. This may be helped by including several representative products, perhaps even 10, in the standard for the classification.

[0058] There are of course other ways to determine uniformity. A statistical method would be to count the number of speckles on each coated product in the sample and determine an average and a standard deviation. For the most part, however, since the goal of the invention is to make a product that will be pleasing to consumers, who will judge the product and quality control on visual perception, the most relevant way to determine if uniform distribution has been achieved is simply the visual perception from viewing products in the sample.

[0059] As can be seen from Figs. 57A – 7E, the random distribution of speckle particulates on coated comestibles can produce widespread variations. Hence, to

achieve reproducible uniformity, especially in large batches of products made in large scale commercial coating equipment, it will be necessary to apply the speckle particulate in a fashion that can be reproduced from one batch to the next, and that applies the speckle particulates at a uniform rate, preferably from multiple spaced apart distributors, over a time period when the cores are wet. This is particularly difficult because core-to-core transfer of speckles should be avoided. This is different than many other aspects of the coating operation, where it is not important that syrup, for example, is evenly distributed in time or space within the coating apparatus, because the syrup can flow from one core to the next as the cores tumble. However, with the application of speckle particulates in a large drum, the cores must be contacted by the speckle particulates when the cores reach the surface of the mass of tumbling cores in the drum, and before they disappear under the next layer of surfacing cores.

[0060] Since the invention is particularly relevant to coated chewing gum products, the center core and the coating of chewing gum products will now be discussed.

[0061] In general, a chewing gum composition typically comprises a water-soluble bulk portion, a water insoluble chewable gum base portion and typically water-insoluble flavoring agents. The water-soluble portion dissipates with a portion of the flavoring agent over a period of time during chewing. The gum base portion is retained in the mouth throughout the chew.

[0062] The insoluble gum base generally comprises elastomers, resins, fats and oils, softeners and inorganic fillers. The gum base may or may not include wax. The insoluble gum base can constitute approximately 5% to about 95% by weight of the chewing gum, more commonly the gum base comprises 10% to about 50% of the gum, and in some preferred embodiments approximately 25% to about 35% by weight, of the chewing gum. In pellet gum center formulations, the level of insoluble gum base may be much higher.

[0063] In a particular embodiment, the chewing gum base of the present invention contains about 20% to about 60% by weight synthetic elastomer, about 0% to about 30% by weight natural elastomer, about 5% to about 55% by weight

elastomer plasticizer, about 4% to about 35% by weight filler, about 5% to about 35% by weight softener, and optional minor amounts (about 1% or less by weight) of miscellaneous ingredients such as colorants, antioxidants, etc.

[0064] Synthetic elastomers may include, but are not limited to, polyisobutylene with GPC weight average molecular weights of about 10,000 to about 95,000, isobutylene-isoprene copolymer (butyl elastomer), styrene butadiene, copolymers having styrene-butadiene ratios of about 1:3 to about 3:1, polyvinyl acetate having GPC weight average molecular weights of about 2,000 to about 90,000, polyisoprene, polyethylene, vinyl acetate – vinyl laurate copolymers having vinyl laurate contents of about 5% to about 50% by weight of the copolymer, and combinations thereof.

[0065] Preferred ranges are: 50,000 to 80,000 GPC weight average molecular weight for polyisobutylene; 1:1 to 1:3 bound styrene butadiene for styrene butadiene; 10,000 to 65,000 GPC weight average molecular weight for polyvinyl acetate, with the higher molecular weight polyvinyl acetates typically used in bubble gum base; and a vinyl laurate content of 10 to 45% for vinyl acetate vinyl laurate.

[0066] Natural elastomers may include natural rubber such as smoked or liquid latex and guayule, as well as natural gums such as jelutong, lechi caspi, perillo, sorva, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and combinations thereof. The preferred synthetic elastomer and natural elastomer concentrations vary depending on whether the chewing gum in which the base is used is adhesive or conventional, bubble gum or regular gum, as discussed below. Preferred natural elastomers include jelutong, chicle, sorva and massaranduba balata.

[0067] Elastomer plasticizers may include, but are not limited to, natural rosin esters such as glycerol esters or partially hydrogenated rosin, glycerol esters of polymerized rosin, glycerol esters of partially dimerized rosin, glycerol esters of rosin, pentaerythritol esters of partially hydrogenated rosin, methyl and partially hydrogenated methyl esters of rosin, pentaerythritol esters of rosin; synthetics such as terpene resins derived from alpha pinene, beta pinene, and/or d-limonene; and

any suitable combinations of the foregoing. The preferred elastomer plasticizers will also vary depending on the specific application, and on the type of elastomer which is used.

[0068] Fillers/texturizers may include magnesium and calcium carbonate, ground limestone, silicate types such as magnesium and aluminum silicate, clay, alumina, talc, titanium oxide, mono-, di- and tri calcium phosphate, cellulose polymers, such as wood, and combinations thereof.

[0069] Softeners/emulsifiers may include tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, mono-, di- and triglycerides, acetylated monoglycerides, fatty acids (e.g. stearic, palmitic, oleic and linoleic acids), and combinations thereof.

[0070] Colorants and whiteners may include FD&C type dyes and lakes, fruit and vegetable extracts, titanium dioxide, and combinations thereof.

[0071] The base may or may not include wax. An example of a wax free gum base is disclosed in U.S. Patent No. 5,286,500, the disclosure of which is incorporated herein by reference.

[0072] In addition to a water-insoluble gum base portion, a typical chewing gum composition includes a water-soluble bulk portion and one or more flavoring agents. The water-soluble portion can include bulk sweeteners, high-intensity sweeteners, flavoring agents, softeners, emulsifiers, colors, acidulants, fillers, antioxidants, and other components that provide desired attributes.

[0073] Softeners are added to the chewing gum in order to optimize the chewability and mouth feel of the gum. The softeners, which are also known as plasticizers and plasticizing agents, generally constitute between approximately 0.5% to about 15% by weight of the chewing gum. The softeners may include glycerin, lecithin, and combinations thereof. Aqueous sweetener solutions such as those containing sorbitol, hydrogenated starch hydrolysates, corn syrup and combinations thereof, may also be used as softeners and binding agents in chewing gum.

[0074] Bulk sweeteners include both sugar and sugarless components. Bulk sweeteners typically constitute about 5% to about 95% by weight of the chewing gum, more typically, about 20% to about 80% by weight, and more commonly, about 30% to about 60% by weight of the gum. Sugar sweeteners generally include saccharide-containing components commonly known in the chewing gum art, including but not limited to, sucrose, dextrose, maltose, dextrin, dried invert sugar, fructose, galactose, corn syrup solids, and the like, alone or in combination. Sugarless sweeteners include, but are not limited to, sugar alcohols such as sorbitol, mannitol, xylitol, hydrogenated starch hydrolysates, maltitol, hydrogenated isomaltulose, and the like, alone or in combination.

[0075] High-intensity artificial sweeteners can also be used, alone or in combination, with the above. Preferred sweeteners include, but are not limited to, sucralose, aspartame, N-substituted APM derivatives such as neotame, salts of acesulfame, alitame, saccharin and its salts, cyclamic acid and its salts, glycyrrhizin, dihydrochalcones, thaumatin, monellin, and the like, alone or in combination. In order to provide longer lasting sweetness and flavor perception, it may be desirable to encapsulate or otherwise control the release of at least a portion of the artificial sweetener. Such techniques as wet granulation, wax granulation, spray drying, spray chilling, fluid bed coating, coacervation, and fiber extrusion may be used to achieve the desired release characteristics.

[0076] Combinations of sugar and/or sugarless sweeteners may be used in chewing gum. Additionally, the softener may also provide additional sweetness such as with aqueous sugar or alditol solutions.

[0077] If a low calorie gum is desired, a low caloric bulking agent can be used. Examples of low caloric bulking agents include: polydextrose; oligofructose (Raftilose); inulin (Raftilin); fructooligosaccharides (NutraFlora); palatinose oligosaccharide; guar gum hydrolysate (BeneFiber); or indigestible dextrin (Fibersol). However, other low calorie bulking agents can be used.

[0078] A variety of flavoring agents can also be used, if desired. The flavor can be used in amounts of about 0.1 to about 15 weight percent of the gum, and preferably, about 0.2% to about 5% by weight. Flavoring agents may include

essential oils, synthetic flavors or mixtures thereof including, but not limited to, oils derived from plants and fruits such as citrus oils, fruit essences, peppermint oil, spearmint oil, other mint oils, clove oil, oil of wintergreen, anise and the like. Artificial flavoring agents and components may also be used. Natural and artificial flavoring agents may be combined in any sensorially acceptable fashion.

[0079] In general, chewing gum is manufactured by sequentially adding the various chewing gum ingredients to a commercially available mixer known in the art. After the ingredients have been thoroughly mixed, the gum mass is discharged from the mixer and shaped into the desired form such as rolling sheets and cutting into sticks, extruding into chunks or casting into pellets, which are then coated or panned.

[0080] Generally, the ingredients are mixed by first melting the gum base and adding it to the running mixer. The base may also be melted in the mixer itself. Color or emulsifiers may also be added at this time. A softener such as glycerin may also be added at this time, along with syrup and a portion of the bulking agent. Further parts of the bulking agent are added to the mixer. Flavoring agents are typically added with the final portion of the bulking agent. Other optional ingredients are added to the batch in a typical fashion, well known to those of ordinary skill in the art.

[0081] The entire mixing procedure typically takes from five to fifteen minutes, but longer mixing times may sometimes be required. Those skilled in the art will recognize that many variations of the above described procedure may be followed.

[0082] After the ingredients are mixed, the gum mass is formed into pellets or balls. Pellet or ball gum is prepared as conventional chewing gum but formed into pellets that are pillow shaped, or into balls. The pellets/balls are used as cores for the coated product. The cores can be sugar or polyol coated or panned by conventional panning techniques to make a unique coated pellet gum. The weight of the coating may be about 20% to about 50% of the weight of the finished product, but may be as much as 75% of the total gum product.

[0083] Conventional panning procedures generally coat with sucrose, but recent advances in panning have allowed use of other carbohydrate materials to be used in place of sucrose. Some of these components include, but are not limited to, sugars such as dextrose, maltose and palatinose; or sugarless bulk sweeteners such as xylitol, sorbitol, hydrogenated isomaltulose, erythritol, lactitol, maltitol, and other new polyols (also referred to as alditols) or combinations thereof. The coating may thus be a sugar coating or sugarless. These materials may be blended with panning modifiers including, but not limited to, gum arabic, maltodextrins, corn syrup, gelatin, cellulose type materials like carboxymethyl cellulose or hydroxymethyl cellulose, starch and modified starches, vegetables gums like alginates, locust bean gum, guar gum, and gum tragacanth, insoluble carbonates like calcium carbonate or magnesium carbonate and talc. Antitack agents may also be added as panning modifiers, which allow the use of a variety of carbohydrates and sugar alcohols to be used in the development of new panned or coated gum products. Flavors may also be added with the sugar or sugarless coating to yield unique product characteristics.

[0084] As noted above, the coating may contain ingredients such as flavoring agents, as well as dispersing agents, coloring agents, film formers and binding agents. Flavoring agents contemplated by the present invention include those commonly known in the art such as essential oils, synthetic flavors or mixtures thereof, including but not limited to oils derived from plants and fruits such as citrus oils, fruit essences, peppermint oil, spearmint oil, other mint oils, clove oil, oil of wintergreen, anise and the like. The flavoring agents may be used in an amount such that the coating will contain from about 0.2% to about 3% flavoring agent, and preferably from about 0.7% to about 2.0% flavoring agent.

[0085] High-intensity sweeteners contemplated for use in the coating include but are not limited to synthetic substances, saccharin, thaumatin, alitame, saccharin salts, aspartame, and N substituted APM derivatives such as neotame, sucralose and acesulfame-K. The high-intensity sweetener may be added to the coating syrup in an amount such that the coating will contain from about 0.01% to

about 2.0%, and preferably from about 0.1% to about 1.0% high-intensity sweetener. Preferably the high-intensity sweetener is not encapsulated.

[0086] Dispersing agents are often added to syrup coatings for the purpose of whitening and tack reduction. Dispersing agents contemplated by the present invention to be employed in the coating syrup include titanium dioxide, talc, or any other antistick compound. Titanium dioxide is a presently preferred dispersing agent of the present invention. The dispersing agent may be added to the coating syrup in amounts such that the coating will contain from about 0.1% to about 1.0%, and preferably from about 0.3% to about 0.6% of the agent.

[0087] Coloring agents are preferably added directly to the syrup in the dye or lake form. Coloring agents contemplated by the present invention include food quality dyes. Film formers preferably added to the syrup include methyl cellulose, gelatins, hydroxypropyl cellulose, ethyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose and the like and combinations thereof. Binding agents may be added either as an initial coating on the chewing gum center or may be added directly into the syrup. Binding agents contemplated by the present invention include gum arabic, gum talha (another type of acacia), alginate, cellulose, vegetable gums and the like, and used at a level of about 1% to about 12% of the coating.

[0088] The coating is initially present as a liquid syrup which contains from about 30% to about 80% or 85% of the coating ingredients previously described herein, and from about 15% or 20% to about 70% of a solvent such as water. In general, the coating process is carried out in a rotating pan. Sugar or sugarless gum center tablets to be coated are placed into the rotating pan to form a moving mass.

[0089] The material or syrup which will eventually form the coating is applied or distributed over the gum center tablets. Flavoring agents may be added before, during and after applying the syrup to the gum centers. Once the coating has dried to form a hard surface, additional syrup additions can be made to produce a plurality of coatings or multiple layers of hard coating.

[0090] In a hard coating panning procedure, syrup is added to the gum center tablets at a temperature range of from about 100°F (38°C) to about 240°F (116°C). Preferably, the syrup temperature is from about 130°F (54°C) to about 200°F (94°C) throughout the process in order to prevent the polyol or sugar in the syrup from crystallizing. The syrup may be mixed with, sprayed upon, poured over, or added to the gum center tablets in any way known to those skilled in the art.

[0091] In general, a plurality of layers is obtained by applying single coats, allowing the layers to dry, and then repeating the process. The amount of solids added by each coating step depends chiefly on the concentration of the coating syrup. Any number of coats may be applied to the gum center tablet. Preferably, no more than about 75-100 coats are applied to the gum center tablets. The preferred embodiments of the invention contemplates applying an amount of syrup sufficient to yield a coated comestible containing about 10% to about 65% coating.

[0092] Those skilled in the art will recognize that in order to obtain a plurality of coated layers, a plurality of premeasured aliquots of coating syrup may be applied to the gum center tablets. It is contemplated, however, that the volume of aliquots of syrup applied to the gum center tablets may vary throughout the coating procedure.

[0093] Once a coating of syrup is applied to the gum center tablets, the present invention contemplates drying the wet syrup in an inert medium. A preferred drying medium comprises air. Preferably, forced drying air contacts the wet syrup coating in a temperature range of from about 70°F (21°C) to about 115°F (46°C). More preferably, the drying air is in the temperature range of from about 80°F (27°C) to about 100°F (38°C). The invention also contemplates that the drying air possesses a relative humidity of less than about 15 percent. Preferably, the relative humidity of the drying air is less than about 8 percent.

[0094] The drying air may be passed over and admixed with the syrup coated gum centers in any way commonly known in the art. Preferably, the drying air is blown over and around or through the bed of the syrup coated gum centers at a flow rate, for large scale operations, of about 2800 cubic feet per minute. If lower

quantities of material are being processed, or if smaller equipment is used, lower flow rates would be used.

[0095] The present invention also contemplates the application of powder material after applying an aliquot of coating syrup to help build up the coating.

[0096] For many years, flavors have been added to a sugar coating of pellet gum to enhance the overall flavor of gum. These flavors include spearmint flavor, peppermint flavor, wintergreen flavor, and fruit flavors. These flavors are generally preblended with the coating syrup just prior to applying it to the cores or added together to the cores in one or more coating applications in a revolving pan containing the cores. Generally, the coating syrup is very hot, about 130°F (54°C) to 200°F (93°C), and the flavor may volatilize if preblended with the coating syrup too early.

[0097] The coating syrup is preferably applied to the gum cores as a hot liquid, the sugar or polyol allowed to crystallize, a dry charge added and the coating then dried with warm, dry air. Aliquots of syrups are preferably applied in about 30 to 80 applications to obtain a hard shell coated product having an increased weight gain of about 25% to 75%. A flavor is applied with one, two, three or even four or more of these coating applications. Each time flavor is added, several non-flavored coatings are applied to cover the flavor before the next flavor coat is applied. This reduces volatilization of the flavor during the coating process. Dry charge is not used when flavor is applied.

[0098] For mint flavors such spearmint, peppermint and wintergreen, some of the flavor components are volatilized, but sufficient flavor remains to give a product having a strong, high impact flavor. Fruit flavors, that may contain esters, are more easily volatilized and may be flammable and/or explosive and therefore, generally these types of fruit flavors are not used in coatings.

Examples

[0099] Examples 1 and 2

[00100] The following gum formula was made in production equipment to prepare chewing gum cores for coating:

<u>Ingredients in Gum Center</u>	<u>Example 1</u>	<u>Example 2</u>
Gum base	30.0%	30.0%
Calcium carbonate	14.9%	14.9%
Sorbitol	43.3%	43.7%
Glycerin	3.8%	3.8%
Sodium polyphosphate	2.0%	2.0%
Spearmint flavor	3.0%	-
Peppermint flavor	-	2.6%
Water	1.0%	1.0%
Encapsulated intense sweeteners	1.9%	1.9%
Free aspartame	0.1%	0.1%
Total	100.0%	100.0%

Ingredients in Coating

Center weight	1250 Kg	1250 Kg
Coating weight	660.5 Kg	660.5 Kg
Maltitol in syrup form	78.3%	76.2%
Maltitol in powder form	12.2%	12.4%
Gum arabic	6.9%	8.2%
Spearmint flavor	1.0%	-
Peppermint flavor	-	1.3%
Titanium dioxide	0.6%	1.0%
Free aspartame	0.5%	0.5%
Green speckles	0.3%	-
Blue speckles	-	0.2%
Carnauba wax	0.1%	0.1%

Ingredients in Coating

Talc	0.1%	0.1%
Total	100.0%	100.0%

[00101] Gum centers were made by conventional manufacturing processes and formed into 1 gram pillow shaped pellets for coating. Gum arabic was dissolved in water prior to being added to all of the coating syrup. In addition, titanium dioxide was dispersed in water before being added to the coating syrup. Free aspartame was also added to the coating syrup. Powdered maltitol was added as a dry charge after each of the first 10 coating applications. The dry charge was not used during flavor applications. Flavor was applied in the middle of the coating process. One fourth of the flavor was applied after each of four syrup applications (half of regular size applications) and several applications of syrup were applied between the flavor applications. Another about 10 syrup applications were made to bring the piece to size. Then smoothing syrups were used in the last few coats. After the last coating syrup was applied and before it dried, the green (Example 1) or blue (Example 2) speckles were added. After the speckles were added and the last coating application was dried, the wax and talc was added to polish the products. The total piece weight was 1.52 grams having a 34.2% coating.

[00102] Example 3

Ingredients in Gum Center

Gum base	33.0%
Calcium carbonate	13.0%
Sorbitol	45.2%
Glycerin	3.0%
Sodium polyphosphate	2.0%
Peppermint flavor	1.7%

Color	1.0%
Lecithin	0.25%
Encapsulated sweeteners	0.7%
Xylitol	0.1%
Free aspartame	<u>0.05%</u>
Total	100.0

Coating Level

Weight of centers	1250 Kg
Weight of coating	601 Kg

Ingredients in Coating

Xylitol	88.1%
Gum arabic	9.1%
Titanium dioxide	0.8%
Peppermint flavor	1.2%
Free aspartame	0.3%
Blue speckles	0.3%
Talc	0.1%
Carnauba wax	0.1%
Total	100.0

[00103] Gum centers were made by conventional manufacturing processes and formed into 1 gram pillow shaped pellets for coating. Gum arabic was dissolved in water prior to being added to all of the coating syrup. In addition, titanium dioxide was dispersed in water before being added to the coating syrup. Free aspartame was also added to the coating syrup. Flavor was applied in the middle of the coating process. One fourth of the flavor was applied after each of

four syrup applications (half of regular size applications) and several applications of syrup were applied between the flavor applications. About 10 more syrup applications were made to bring the piece to size, and then smoothing syrups were used in the last few applications. After the last coating syrup was applied and before it dried, the blue speckles were added. After the speckles were added and the last coating application was dried, the wax and talc was added to polish the products. The total piece weight was 1.52 grams having a 34.2% coating.

[00104] If an automated system using the equipment of Figs 1-6 were used with Example 3, the system might be set up such that after a 30 second spray of the last syrup coating, a 12 second pause occurs. Then the air supply to the venturi eductors is started, and 2 seconds later the vibratory pan is started, each of these items being automatically started by the controller where the coating process is programmed. About 40 seconds after the vibratory pan is started, speckle particulates begin to flow into the venturi eductors and are immediately conveyed to the distributors inside the coating drum, where the air sprays out the end of the hose and the speckle particulates are deflected by the conical deflectors to spray out over the bed of tumbling cores. It may take 204 seconds for the speckle application to be completed. A 4.5 minute drying time follows, using a 4 rpm pan speed, and 8475 cubic feet/minute of 75°F direct flow air.

[00105] The present invention makes it possible to commercially produce large batches of speckled coated comestible products with a uniform number of speckles on each product within the batch, as well as good batch-to-batch consistency. As a result, a company making such products can sell speckled products with good uniformity of speckle distribution from one product to the next, evidencing a high product quality.

[00106] If particulate materials other than speckle particulates are being applied, or if the speckle particulates are not soluble in the coating syrup, it may not be necessary to apply the particulates after the last aliquot of coating syrup is applied. Instead, the apparatus and method of the present invention will allow the uniform application of particulate materials between applications of coating syrup other than after the last application, or between more than one different

applications of coating syrup in the process of applying a coating to a single batch of cores.

[00107] It should be appreciated that the methods of the present invention are capable of being incorporated in the form of a variety of embodiments, only a few of which have been illustrated and described above. For example, it can easily be seen that other particulates could be added to a comestible core using the present invention. Further, in an earlier embodiment, the vibratory pan 40 was not equipped with dividers and separate lanes. The separation of particulates into portions occurred as the particulates fell off the end of the pan into collection tubes feeding the venturi eductors. In that instance, one plate that could be adjusted in height from one side to the other was used to get an even distribution of speckle particulates over the width of the vibrating pan, instead of individual strips 49 associated with each lane. Separate screw feeders could be used to provide an equal supply of speckle particulates over a desired time to each distributor within the coating apparatus. Another embodiment would be a long tube that holds the particulate material with either one continuous or many multiple holes in the tube, covered with a screen to produce a "salt shaker" effect. The speckles would be loaded in the tube, which would then be placed right-side-up in the coating apparatus. At the appropriate time the tube would be rotated so that the holes were on the bottom and shaken, causing the speckle particulates to be evenly distributed over the tumbling cores over a period of time.

[00108] All of the preferred embodiments relate to any or all of the independently claimed processes and apparatus, taken either singly or in combination. The invention may be embodied in other forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive, and the scope of the invention, therefore, indicated by the appended claims rather than by the foregoing description. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.